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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,702	06/27/2003	Thomas S. Ellis	DP-309231	9673

22851 7590 08/25/2006
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EXAMINER

NGUYEN, DILINH P

ART UNIT PAPER NUMBER

2814

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,702

Applicant(s)

ELLIS ET AL.

Examiner

DiLinh Nguyen

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,4-14,16-22 and 24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 2,4-14,16-22,24 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

Claim 24 is objected to because of the following informalities:

Lines 8 and 9, replace "a polymer composite" with -- the polymer composite --.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) (previously applied) in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied).

- Regarding claim 4, Kaminaga et al. disclose an encapsulated, overmolded and/or underfilled electrical component, comprising:

an electrical component encapsulated 1, overmolded and/or underfilled with a polymeric composite including a synthetic resin matrix 7 and inorganic filler particles substantially uniformly distributed in the matrix (fig. 1a, column 6, lines 10-15).

Kaminaga et al. do not explicitly disclose the particles having a platelet structure and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite.

However, Matayabas, JR. et al. disclose a semiconductor device comprising: particles having a platelet structure defined by opposite substantially flat and substantially parallel faces (para 0024, claim 6), the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite (claim 30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the particles of Kaminaga et al. by having particles having platelet structure such as clay because as taught by Matayabas, JR. et al., for the purposes of aiding exfoliation in the composite assure in quality and low molecular weight components through the material (para 0044 and para 0045).

- Regarding claim 2, Kaminaga et al. disclose wherein the electrical component is a substrate 1 having an electrical circuit formed on at least one surface of the substrate and at least one semiconductor chip 3 electrically connected to the electrical circuit (fig. 1A).
- Regarding claim 5, Matayabas, JR. et al. disclose that the inorganic filler content is 0.5 weight percent to 25 weight percent based on the weight of the polymeric composite (claim 30).
- Regarding claims 6-7, Matayabas, JR. et al. disclose that wherein the filler is a smectite clay mineral and wherein the smectite clay mineral is montmorillonite (claim 13).
- Regarding claims 8-9, Kaminaga et al. disclose the matrix is an epoxy resin (column 3, lines 67 and column 6, line 10).
- Regarding claim 10, Matayabas, JR. et al. disclose that wherein the matrix is a thermoplastic resin (para 0024).

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) (previously applied) in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied) as applied to claim 4 above, and further in view of Capote et al. (U.S. Pat. 6335571) (previously applied).

As discussed in details above, the combination of Kaminaga et al. in view of Matayabas, JR. et al. substantially disclose all the limitations as claimed above except for the composite has a CTE from about 5 to 20 ppm/°C.

However, Capote et al. disclose a semiconductor device comprising a composite has a CTE from about 5 to 20 ppm/°C (cover fig., column 8, lines 15-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of the above combination to minimize the stress on the solder joint for the composite, as shown by Capote et al. (column 8, lines 17-19).

4. Claims 4 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chuang et al. (U.S. Pub. 2004/0084758) (previously applied) in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied).

Chuang et al. disclose an encapsulated, overmolded and/or underfilled electrical component, comprising:

an electrical component 31 or 36 encapsulated and overmolded with a polymeric composite including a thermoplastic resin matrix 39, wherein the thermoplastic resin is selected from polycarbonates and polyester (cover fig., para 0027).

Chuang et al. do not explicitly disclose the matrix comprising inorganic filler particles having a platelet structure and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite.

However, Matayabas, JR. et al. disclose a semiconductor device comprising inorganic filler particles having a platelet structure defined by opposite substantially flat and substantially parallel faces (para 0024, claim 6), the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite (claim 30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device structure of Chuang et al. by having inorganic filler particles having platelet structure such as clay because as taught by Matayabas, JR. et al., for the purposes of aiding exfoliation in the composite, assure in quality and low molecular weight components through the material (para 0044 and para 0045).

5. Claims 13 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chuang et al. (U.S. Pub. 2004/0084758) (previously applied) in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied).

- Regarding claims 13 and 16-19, Chuang et al. disclose an encapsulated, overmolded electrical component, comprising:
an electrical component 31 and 36 encapsulated and overmolded with a polymeric composite including a thermoplastic rein matrix 39 (cover fig., column 0027).

Chuang et al. do not explicitly disclose an inorganic particulate filler, wherein the filler is montmorillonite and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite.

However, Matayabas, JR. et al. disclose a semiconductor device comprising a thermoplastic matrix (para 0024) having an inorganic particulate filler is a montmorillonite (claim 13) and wherein the inorganic filler content is 0.5 weight percent to 25 weight percent (claim 30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device structure of Chuang et al. by having an inorganic particulate filler such as montmorillonite because as taught by Matayabas, JR. et al., for the purposes of aiding exfoliation in the composite, assure in quality and low molecular weight components through the material (para 0044 and para 0045).

- Regarding claim 20, Chuang et al. discloses that the resin is selected from the group consisting of polycarbonate and polyester (para 0027).

6. Claims 13-14 and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) (previously applied) in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied).

- Regarding claims 13 and 16-19, Kaminaga et al. disclose an encapsulated, overmolded and/or underfilled electrical component, comprising:
an electrical component encapsulated 1, overmolded and/or underfilled with an epoxy package matrix 7 and an inorganic particulate filler (fig. 1a, column 6, lines 10-15).

Kaminaga et al. do not explicitly disclose the epoxy package 7 is a thermoplastic resin matrix.

However, Matayabas, JR. et al. disclose a semiconductor device comprising a thermoplastic matrix (para 0024) having an inorganic particulate filler is a montmorillonite

(claim 13) and wherein the inorganic filler content is 0.5 weight percent to 25 weight percent (claim 30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device structure of Chuang et al. by having an inorganic particulate filler such as montmorillonite because as taught by Matayabas, JR. et al., for the purposes of aiding exfoliation in the composite, assure in quality and low molecular weight components through the material (para 0044 and para 0045).

- Regarding claim 14, Kaminaga et al. disclose wherein the electrical component is a substrate 1 having an electrical circuit formed on at least one surface of the substrate and at least one semiconductor chip 3 electrically connected to the electrical circuit (fig. 1A).

7. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) (previously applied) or Chuang et al. (U.S. Pub. 2004/0084758) (previously applied) in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied) as applied to claim 13 above, and further in view of Yu et al. (U.S. Pat. 5153657) (previously applied).

As discussed in details above, the combination of Kaminaga et al. or Chuang et al. in view of Matayabas, JR. et al. substantially disclose all the limitations as claimed above except for the inorganic filler is glass spheres.

Yu et al. disclose an inorganic filler is glass spheres (column 13, lines 45) and wherein an average diameter of from about 1 micrometer to about 3 micrometers (column 14, lines 36-37). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select glass spheres as known material, as taught by Yu et al. into

Art Unit: 2814

the device structure of the above combination for forming the inorganic fillers as being claimed since the glass spheres would maintain good conformance in the lateral direction (column 12, lines 31-32). Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

8. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Charles et al. (U.S. Pub. 2003/0218258) (newly cited) in view of Kaminaga et al. (U.S. Pat. 6257215) (previously applied) and further in view of Matayabas, JR. et al. (U.S. Pub. 2004/0191503) (previously applied).

Charles et al. disclose an electrical component comprising:

a substrate 14 having an electrical circuit (cover fig., paragraph 0014, lines 8-10);

a semiconductor chip 12 electrically connected to the substrate, the semiconductor chip 12 being spaced from the substrate by a distance of from about 135 micrometers (cover fig., paragraph 0082, lines 8-9).

Charles et al. do not disclose the component being being completely encased within a polymer composite, the semiconductor chip being completely encased by the substrate and the polymer composite and the particles having a platelet structure and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite.

However, Kaminaga et al. disclose an encapsulated, overmolded and/or underfilled electrical component, comprising:

the component being completely encased within a polymer composite 7, a semiconductor chip 3 being completely encased by the substrate 1 and the polymer composite, and/or the space defined between the semiconductor chip 3 and the substrate 1 being filled with the polymer composite,

wherein the polymeric composite 7 including a synthetic resin matrix and inorganic filler particles substantially uniformly distributed in the matrix (fig. 1a, column 6, lines 10-15), such the component being completely encased within the polymer composite would assure in reliability for the semiconductor package (cover fig.).

Matayabas, JR. et al. disclose a semiconductor device comprising particles having a platelet structure defined by opposite substantially flat and substantially parallel faces (para 0024, claim 6), the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite (claim 30) for the purposes of aiding exfoliation in the composite, assure in quality and low molecular weight components through the material (para 0044 and para 0045).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the component being being completely encased within a polymer composite, the semiconductor chip being completely encased by the substrate and the polymer composite and the particles having a platelet structure and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite as taught by Kaminaga et al. and Matayabas, Jr. et al. into the device of Charles et al. for the purpose of assuring in reliability for the

semiconductor package and aiding exfoliation in the composite, assuring in quality and low molecular weight components through the material.

Response to Arguments

Applicant's arguments filed 6/14/06 have been fully considered but they are not persuasive.

- The applicant argues that there is no motivation or suggestion to combine Kaminaga et al. in view of Matayabas, Jr. et al.

The arguments have been fully considered but they are not persuasive because the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case: Kaminaga et al. do not explicitly disclose the particles having a platelet structure and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite.

However, Matayabas, JR. et al. disclose a semiconductor device comprising particles having a platelet structure defined by opposite substantially flat and substantially parallel faces (para 0024, claim 6), the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite (claim 30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the particles of Kaminaga et al. by having particles having platelet structure such as clay because as taught

Art Unit: 2814

by Matayabas, JR. et al., for the purposes of aiding exfoliation in the composite assure in quality and low molecular weight components through the material (para 0044 and para 0045).

- In response to applicant's argument that there is no motivation to combine the references, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

- The applicant argues that Chuang et al. fail to disclose an electrical component encapsulated, overmolded with a polymeric composite including a thermoplastic resin matrix.

The argument has been fully considered but it is not persuasive because Chuang et al. clearly disclose that electrical components 31 and 36 encapsulated and overmolded with an encapsulant 38, wherein the encapsulant 38 being encapsulated by an encapsulant 39 (cover fig., paragraph 0029, lines 19-20). Therefore, Chuang et al. disclose that the electrical components 31 and 36 encapsulated and overmolded with the encapsulant 39, wherein the encapsulant 39 is a polymeric composite including a thermoplastic rein matrix (cover fig., column 0027).

- The applicant argues that Matayabas, Jr. et al. do not disclose a polymeric composite is using as an encapsulated or overmolded for an electrical component.

Applicant's argument has been fully considered but it is not persuasive because this argument has no immediate apparent relevance to the issues presented by the rejection before us since an appellant cannot show nonobviousness by attacking references individually wherein the rejection is based upon a combination of references. In re Young, 403 F. 2d 754, 757, 159 USPQ 725, 728 (CCPA 1968).

It should be noted that the rejection of claims 2, 4-14 and 16-20 are not based on anticipation, but rather, are based on obviousness.

Examiner relies on the combined teachings at Kaminaga et al. or Chuang et al. in view of Matayabas, Jr. et al. Matayabas, Jr. et al. is not relied on for teaching the an encapsulated, overmolded and /or underfilled electrical component, comprising: an electrical component encapsulated, overmolded and/or underfilled with a polymeric composite. Matayabas, Jr. et al. is relied on for showing a semiconductor device comprising: particles having a platelet structure defined by opposite substantially flat and substantially parallel faces, the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite. The Examiner thus regards the Applicant's assertions as constituting evidence that the Applicant has failed to consider as a whole the prior art teachings disclosed by the combining of the references.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2814

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

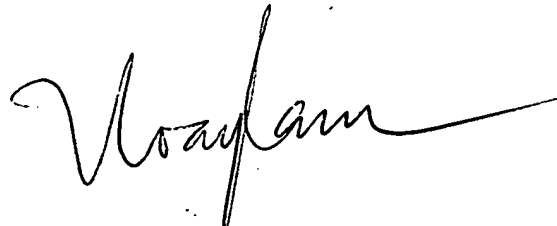
Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 2814

DLN

A handwritten signature in black ink, appearing to read 'Hoai Pham', with a long horizontal flourish extending to the right.

HOAI PHAM
PRIMARY EXAMINER